AC 8-25-05

[06] Figure 2A is a graph showing the rail pressure of a fuel injector during a zero fuel condition according to one embodiment of the invention.

[07] Figure 2b is a graph showing an engine speed of an engine having the fuel injector of Figure 1a during a zero fuel condition according to one embodiment of the invention.

[08] Figure 3 is a flowchart showing a process for adjusting the performance of a fuel injector according to one embodiment of the invention.

Detailed Description

[09] Referring to Fig. 1, a fuel system utilizing a common rail fuel injector 22 according to one embodiment of the invention is shown. Although for exemplary purposes, the discussions herein describe a common rail fuel injector, the invention may apply equally to other types of fuel injectors. A reservoir 10 contains fuel at an ambient pressure. A transfer pump 12 draws low-pressure fuel through fuel supply line 13 and provides it to high-pressure pump 14. High-pressure pump 14 then pressurizes the fuel to desired fuel injection pressure levels and delivers the fuel to fuel rail 16. The pressure in fuel rail 16 is controlled in part by safety valve 18, which spills fuel to the fuel return line 20 if the pressure in rail 16 is above a desired pressure. The fuel return line 20 returns fuel to low-pressure reservoir 10.

[10] Fuel injector 22 draws fuel from rail 16 and injects it into a combustion cylinder of the engine (not shown) by ways known to those skilled in the art. Fuel not injected by injector 22 is spilled to fuel return line 20. An engine control module, such as Electronic Control Module ("ECM") 24 provides general control for the system. ECM 24 receives various input signals, such as from pressure sensor 26 and a temperature sensor 28 connected to fuel rail 16, to determine operational conditions. ECM 24 then sends out various control signals to various components including the transfer pump 12, high-pressure pump 14, and fuel injector 22.